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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/768,886	01/31/2004	Yinong Yang	UAF-03-14	8057
34607	7590	09/07/2006	EXAMINER	
ANGELA FOSTER, PHD, ESQ. 2906 BIRCHWOOD COURT NORTH BRUNSWICK, NJ 08902-3933			KUMAR, VINOD	
			ART UNIT	PAPER NUMBER
			1638	
DATE MAILED: 09/07/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/768,886	<b>Applicant(s)</b> YANG ET AL.	
	<b>Examiner</b> Vinod Kumar	<b>Art Unit</b> 1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 19 June 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 6-55 is/are pending in the application.
- 4a) Of the above claim(s) 11-25, 29, 30, 33, 34, 37, 39-41, 43 and 45-50 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 6-10, 26-28, 31-32, 35, 36, 38, 42, 44 and 51-55 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. The objections to specification are withdrawn in light of amendments to the specification.

3. The objections to claims 8, 26, 35, 38, and 44 are withdrawn in light of amendments to the claims.

4. The rejection of claim 26 under 112, second paragraph is withdrawn in light of claim amendment.

5. The rejection to claims 1-5 under 102(a) is withdrawn in light of claim amendments.

6. The rejection to claims 1-5 under 103(a) is withdrawn in light of claim amendments.

### ***Claims Objections***

7. Claims 27, 31, 42, and 51-55 are objected to because of the following informalities:

In claims 27, line 3, insert punctuation mark comma after "ortholog" and before "wherein".

In claim 27, line 4, insert --, and-- after "family" and before "wherein".

In claim 31, line 5, insert punctuation mark comma after "plant" and before "wherein".

In claim 31, line 6, insert --, and-- after "family" and before "wherein".

In claim 42, line 4, insert punctuation mark comma after "plant" and before "wherein".

In claim 42, line 5, insert --, and-- after "family" and before "wherein".

In claims 51-53, replace "the complement of the nucleotide sequence of SEQ ID NO: 2" with -- the complement of the nucleotide sequence of SEQ ID NO: 1".

In claims 54-55, replace "A" with --The--.

Appropriate corrections are required.

### ***Claim Rejections-35 USC § 112***

8. Claims 27, 31, 35, 36, 38, and 44 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly out and distinctly claim the subject matter which applicant regards as the invention.

Claims 27, 31 and 42 are rejected under 35 U.S.C. 112 as being indefinite in their recitation "functionally similar", which is confusing since "similar" is a relative term, that has no definite meaning and thus render the claims indefinite.

9. Claims 7, 8, 9, 10, 26, 27, 31, 35, 36, 38, 42 and 44 remain and newly added claims 52-55 are rejected under 35 U.S.C. 112, first paragraph, because the

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specification, while being enabling for a transgenic plant with increased stress tolerance and a method of producing said transgenic plant comprising over-expression of a rice nucleic acid sequence as defined in SEQ ID NO: 1 encoding a MAP kinase 5 (MAPK5) polypeptide as defined SEQ ID NO: 2, does not reasonably provide enablement for a transgenic plant with increased stress tolerance or a method of producing said transgenic plant comprising over-expression of any nucleic acid sequence encoding any MAPK5 or MAPK5 ortholog isolated from any source. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims for the reasons of record stated in Office action mailed on February 24, 2006. Applicants traverse the rejection in the paper filed June 19, 2006.

Applicants argue that specification provides guidance to the characteristics of MAPK5 orthologs capable of increasing abiotic stress tolerance in plants. Specifically, the specification provides guidance that enables the skilled artisan to use the current method with little or no experimentation. For example, example 8.3 provides that the only OsMAPK5a possessed kinase activity suggesting the importance of the missing domain in OsMAPK5b (response, paragraph 3, lines 1-8). Furthermore, Applicants argue that Applicants have amended claims 27, 31, 35 and 42 to the family of monocots which corresponds to OsMAPK, the Gramineae family. Thus claimed invention provides guidance for exploiting routine experimentation using the characteristics of OsMAPK5 to isolate a MAPK5 ortholog that is functionally similar to OsMAPK5 and enhances tolerance to abiotic stress thereby enhancing tolerance in a transformed plant (response, page 15, 2<sup>nd</sup> paragraph, lines 1-15).

Applicant's arguments were fully considered but are not found persuasive.

Examiner maintains that MAPK5 orthologs encompass sequences that may be functionally divergent for at least two reasons: a) overexpression or disruption of MAPK gene function can generate nonspecific effects as taught by Zhang et al. (2001), b) members of MAPK gene family may be alternatively spliced to produce products that lack kinase activity. This is evident from Applicants own data where MAPK5b cDNA (alternatively spliced) encodes a kinase protein that lacks enzymatic activity. MAPK5 orthologs encompass members of the MAPK family implicated in diverse cell signaling responses other than stress and defense. Accordingly, Examiner maintains that specification fails to describe how to use any MAPK5 ortholog in a method of producing a low temperature and salt tolerant transgenic plant overexpressing said ortholog. Undue experimentation would have been required by a skilled artisan to determine how to use any MAPK5 ortholog from grass family in obtaining stress tolerant transgenic plant.

Applicants argue that present invention demonstrates that abiotic tolerance can be increased by transforming a plant with a MAPK5 ortholog that is functionally similar to OsMAPK5. One skilled in the art would be aware of the various techniques available to transform a MAPK5 ortholog into a prokaryotic or eukaryotic host cell (response, page 15, 1<sup>st</sup> paragraph, lines 1-5).

Applicant's arguments were fully considered but are not found persuasive.

Applicants are reminded that issue is not how to transform a host cell with a nucleotide sequence encoding OsMAPK5 (SEQ ID NO: 2). The issue is how to use said transformed cell in a method of producing expected results, such as stress tolerance in

the instant case. Applicants have provided guidance on a method of using a bacterial or plant cell transformed with said nucleotide sequence. However, one skilled in the art would not know how to use any host cell expressing a nucleic acid encoding SEQ ID NO: 2. For example, one skilled in the art would not know how to use an animal cell insect cell etc. (for example) comprising said nucleotide sequence encoding SEQ ID NO: 2 (OsMAPK5). Accordingly, examiner maintains undue experimentation would have been required at the time the claimed invention was made to determine how to use any host cell transformed with a nucleotide sequence encoding SEQ ID NO: 2 to practice the claimed invention.

Accordingly, the rejection is maintained for claims 7-10, 26-27, 31, 35-36, 38, 42, 44, and newly added claims 52-54 are rejected for the reasons as set forth above.

10. Claims 27, 31, 35, 36, 38, 42 and 44 remain rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention for the reasons of record stated in Office action mailed February 24, 2006. Applicants did not distinctly and specifically argue the rejection in the paper filed June 19, 2006.

Accordingly, the rejection is maintained.

#### ***Claim Rejections - 35 USC § 102***

11. Claims 6-10 remain and newly added claims 51-55 are rejected under 35 U.S.C. 102(a) as being unpatentable over as being anticipated by Wen et al. (Plant Physiol.,

129:1880-1891, 2002) for the reasons of record stated in the Office action mailed February 24, 2006. Applicants traverse the rejection in the paper filed June 19, 2006.

Applicants argue that Wen et al. investigated the effect of low temperature at 12 °C on mitogen-activated protein signaling components, OsMEK1 and OsMAP1 transcripts. Wen et al. noted that no induction of OsMEK1 or OsMAP1 transcripts were observed when seedlings were exposed to 4 °C or treated with salt. Furthermore, Wen et al. did not express OsMEK1 or OsMAP1 in any host cell, and further Wen et al. does not disclose an expression vector or a genetically engineered host cell comprising MAPK5 that is operatively associated with a regulatory nucleotide sequence containing transcriptional and translational regulatory information that controls expression of the nucleotide sequence in a host cell. Accordingly, Wen et al. cannot anticipate the claimed invention (response, page 16, line 16 through the end of 1<sup>st</sup> paragraph of page 17).

Applicant's arguments were fully considered but are not found persuasive. Examiner maintains that Wen et al. anticipates the claimed invention. Applicants attention is drawn to page 129, figure 7 and page 1889, right column, wherein it is clearly described expression of a nucleotide sequence encoding OsMEK1 (100% sequence identity to instant SEQ ID NO: 2) in a yeast two-hybrid system to demonstrate OsMEK1-OsMAP1 interaction. OsMEK1 cDNA is cloned in a yeast expression vector and operably linked to regulatory nucleotide sequence which inherently comprises transcriptional and translational regulatory information. It is important to note that limitations of specification should not be read into claims because claims do not recite 4 °C or salt tolerance characteristics of any host cell expressing SEQ ID NO: 1.



Furthermore, induction of OsMEK1 at 12 °C encompasses low temperature induction property of OsMEK1 transcript. The property of salt tolerance is inherent to OsMEK1 sequence disclosed in the reference.

Accordingly, rejection is maintained.

***Claim Rejections - 35 USC § 103***

12. Claims 6-10, 26-28, 31-32, 35, 36, 38 are 42 remain and newly added claims 51-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wen et al. (Plant Physiol., 129:1880-1891, 2002) in view of Valvekens et al. (PNAS, 85:5536-5540, 1988) for the reasons of record stated in the Office action mailed February 24, 2006. Applicants traverse the rejection in the paper filed June 19, 2006.

Applicants argue that there is no mention or suggestion of any functional analysis or regulatory correlations of MAPK5 with abiotic stress. The claimed invention specifically teaches OsMAPK5 overexpression resulted in enhanced plant tolerance to drought, salt and cold stress. Wen et al. do not teach that OsMEK1 or OsMAP1 did not play a role in abiotic stress due to low temperature or salinity. Furthermore, Wen et al. does not teach that expression of MAPK5 under cold conditions would enhance abiotic tolerance in plants. Accordingly, rejection to the instant claims under § 103 would indicate the improper use of hindsight gained from Applicant's own specification (response page 19, line 21 through end of 1<sup>st</sup> paragraph of page 20).

Applicant's arguments were fully considered but are not found persuasive. Examiner maintains that Wen et al. teach the abiotic stress tolerant properties of OsMEK1 cDNA encoding a polypeptide which has 100% sequence identity to instant

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SEQ ID NO: 2. Applicant's attention is specifically drawn to page 1884, right column, 1<sup>st</sup> paragraph and page 1996, right column, where abiotic stress tolerant properties of OsMEK1 are taught. The reference vividly teaches that OsMEK1 transcripts are induced at variety of different abiotic stresses, such as low temperature (12 °C), drought and high salt stress conditions. Accordingly Wen et al. provide enough motivation to one of ordinary skill in the art to overexpress OsMEK1 cDNA in a transgenic plant using any plant transformation method including the one taught by Valvekens to produce the abiotic stress tolerant transgenic plant with reasonable expectation of success. Accordingly, examiner maintains that the claimed invention as a whole was prima facie obvious over the combined teachings of the prior art.

Accordingly, the rejection is maintained.

### ***Summary***

13. Claims 6-10, 26-28, 31-32, 35, 36, 38, 42, 44 and 51-55 are rejected.

Applicants amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is set to expire within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then

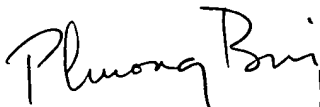
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the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vinod Kumar whose telephone number is (571) 272-4445. The examiner can normally be reached on 8.30 a.m. to 5.00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached on (571) 272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
8/28/06  
PHUONG T. BUI  
PRIMARY EXAMINER